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RESEARCH ON THE HUMAN SENSITIVITY LEVEL PORTION

U.S. FOREST SERVICE VISUAL MANAGEMENT SYSTEM

FINAL REPORT

By

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December 31, 1976

#1528110333 ID:88081707

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PREFACE

This report covers research conducted under four cooperative agreements between the USDA Forest Service and the Regents of the University of California:

1. Agreement No. 21-320

   Title: "Conducting An Administrative Study of Available Methods Adaptable for Evaluating the Significance to Various Publics of Scenic Values Influenced by Alternative Timber Management Plans"

2. Agreement No. 21-380

   Title: "Administrative Study of Available Methods Adaptable for Evaluating the Significance to Various Publics of Scenic Values Influenced by Alternative Timber Management Plans"

3. Agreement No. 21-382

   Title: "Conducting an Administrative Study for Refining, Testing and Making Operational a Method for Assessing Public Sensitivity to Scenic Values Influenced by Alternative Timber Management Plans"

4. Agreement No. PSW-2 to Cooperative Agreement No. 21-395

   Title: "Test and Evaluate A Refined Methodology for Implementation in a Visual Management System"

The results from research on public sensitivity to managed forest landscapes are reported as follows. The report begins with a summary of the major results. This is followed by a summary of management recommendations indicated by these results. Detailed discussions of the research problems, methods, results, and revised procedures for assessing public sensitivity are contained in a set of appendixes. Readers interested in specific issues may read the appropriate appendixes independently.

This study utilized qualitative social data to revise procedures for determining Sensitivity Levels. Descriptive data were used to test the plausibility of assumptions underlying existing procedures and to formulate new assumptions and theory. Comprehensive statistical validation of the revised methodology was not called for and cannot be expected from an administrative study of this kind. Adaptability of the methodology to management problems will be tested by trial applications -- performance will be evaluated by practice. A separate study, sponsored by the University of California, was used to gather quantitative survey data that can be used to test major features of the new assumptions and theory. Results from this study will be reported when data analysis is completed.

A number of persons contributed to this research effort. Robert Ewing, a graduate student in the Department of Forestry and Conservation at Berkeley, provided some of the intellectual insights and helped formulate the approach to research. Karen Rosenberg, a research specialist in the Department of Forestry and Conservation, assisted with data gathering and analysis. Arthur McGill of the Pacific Southwest Forest and Range Experiment Station was the cooperative adminstrator with the U.S. Forest Service. Warren Bacon and Ron Walters, Region 6 Landscape Architects, provided administrative guidance and cooperation with the development and conduct of the study. Wayne Iverson and Ray Collins, Region 5 Landscape Architects, also provided administrative assistance.

Results from exploratory investigations of public concern with the visual quality of forest lands provides the U.S. Forest Service with:

1) Information on the process by which people respond to forest landscapes,

2) a method for classifying publics on the basis of how they acquire knowledge and values pertaining to forest lands, and

3) a revised methodology for determing Sensitivity Levels in the Visual Management System.

SUMMARY OF RESEARCH RESULTS

Visitor Responses to Forest Landscapes

Analysis of interviews, observations, and documents gathered from a variety of social groups concerned with the Mount Hood National Forest revealed that:

1) The process by which viewers judged forest landscapes was far more complex than simply applying an abstract standard. Variety, complexity, and naturalness were important dimensions of visual quality, but they were not used as universal standards.

2) People judged scenic quality by a process similar to that used to judge forms of artistic expression. They sought the meaning or purpose of the land's physical features, and then judged whether they liked or disliked the landscape as an object with particular meanings.

3) People had different kinds of landscape experiences, depending on how their knowledge and values interacted with the physical features in a particular scene.

Method of Classifying Publics

Comparative analysis of qualitative data gathered from a variety of social groups in the vicinity of Mount Hood National Forest and Portland, Oregon revealed that:

1) People's judgments of scenic quality were influenced heavily by the social role they played in relating to forest lands. People who related to the forest as members of a special interest groups made different judgments than they would when acting as a recreational user.

2) Roles that brought people into direct contact with the forest resulted in different forms and knowledge and values than roles in which people experienced the forest vicariously through mass media.

3) A method for classifying publics could be based on an understanding of how the roles people played influenced their values and the information they obtained about forest lands.

MANAGEMENT RECOMMENDATIONS

Following is a summary of the recommended revisions in procedures for assessing Sensitivity Level in the Visual Management System:

1) Sensitivity Level should be redefined as a measure of viewer interpretations and evaluations of particular forest scenes.

2) Sensitivity Levels should be determined by assessing viewer interpretations and evaluations of the physical attributes that can be seen in foreground, middleground, and background from various kinds of viewing places.

3) Overlays for all existing and proposed alternative land uses should be displayed to describe the physical attributes of forest lands and the positions from which these attributes can be viewed.

4) Sensitivity Level analysis should be integrated with land use planning in order to obtain information on proposed alternative land uses.

5) Sensitivity Level values should be assigned empirically for a national forest or homogeneous socio-cultural region containing several national forests.

6) Subjectivity in assigning Sensitivity Levels should be eliminated by developing a matrix specifying empirically determined Sensitivity Level values for various on-site conditions within a forest or region.

7) Subjectivity in developing the Sensitivity Level values for the matrix can be reduced by use of an empirical method review by outside experts, and public involvement of forest viewers.

APPENDIX A

PROBLEMS WITH ASSESSING HUMAN SENSITIVITY TO MANAGED FOREST LANDSCAPES

The first step in developing an approach to assessing people's concern with forest landscapes was to understand how landscape management had been incorporated in U.S. Forest Service management procedures. An examination of existing procedures revealed two sorts of weaknesses in Sensitivity Level analysis: (1) procedures for assessing concern were based on subjective criteria; and (2) the linkage of Sensitivity Level with the rest of the Visual Management System was inappropriate. Research was designed to investigate in greater detail public concern for landscape quality and to remedy procedural weaknesses by providing revised criteria and procedures for incorporating visual concern in landscape management. Discussion of these problems is divided into three sections: existing procedures, research needed on public concern, and the position of Sensitivity Levels in the Visual Management System.

A.1. Existing Procedures: The Visual Management System

The U.S. Forest Service has developed procedures for assessing the visual quality of forest environments. These procedures are described in Chapter 1, Volume 2 of The Visual Management System, titled "National Forest Landscape Management" (U.S.D.A., Forest Service, 1974). The basic elements in the application of the Visual Management System (VMS) to forest landscape management are represented diagrammatically in Figure 1.

The process begins with the land base and the resources contained thereon. The purpose of the process is to inventory and interpret the visual resource on National Forest lands. Visual resource inventory in-

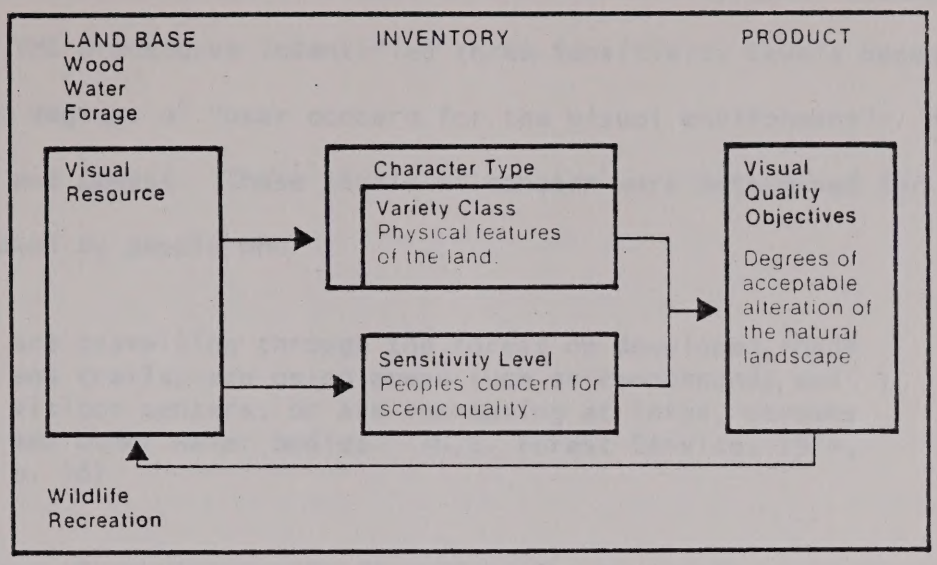
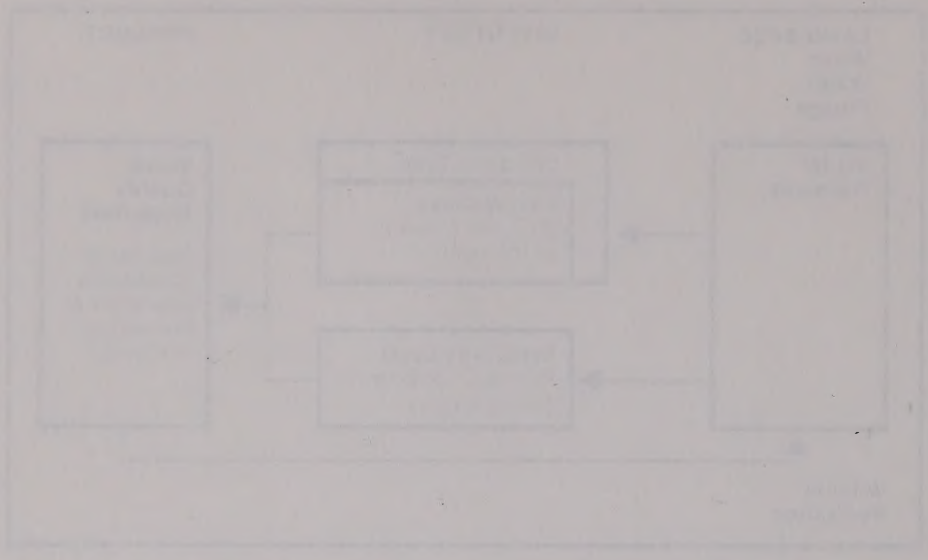


Figure 1. Elements and Process of Landscape Assessment from the Visual Management System (U.S. Forest Service, 1974, p. 9).

volves the combined assessment of physical featuers of the land and people's concern for scenic quality. The assessment of physical features involves indentification of land areas with common distinguishing visual characteristics (Character Types) and classification of landscapes within Character Types on the basis of visual variety (Variety Class). The term Sensitivity Level has been used to refer to the measure of people's concern for the scenic quality of the National Forests. Sensitivity Levels are determined for landscapes viewed on the ground and, in some cases, for landscapes viewed from the air. These inventory data are combined to generate Visual Quality Objectives -- the final product of the assessment process. These objectives describe the ability of various forest landscapes to undergo alteration without substantial depreciation of their naturally appearing character.



This research project focused on the Sensitivity Level element. Existing VMS procedures indentified three Sensitivity Levels based on different degrees of "user concern for the visual environment": Highest, Average, and Lowest. These levels of concern were determined for land areas viewed by people who

> are travelling through the forest on developed roads and trails; are using areas such as campgrounds and visitor centers; or are recreating at lakes, streams and other water bodies. (U.S. Forest Service, 1974, p. 18)

Some degree of sensitivity is identified for the entire land base since National Forest land is viewed by aircraft users. Sensitivity Levels are assigned through a two-step process. The first step involves classifying all viewing places (travel routes, use areas, and water bodies) on the basis of primary or secondary importance. This involves a subjective judgment regarding whether the place has national or local importance, has high or low use volume or intensity, long or short use duration, and large or small size. The second step involves indentification of the "major and minor concerns of users for the scenic qualities of the Forest," where

> Major concern for aesthetics is usually expressed by people who are driving for pleasure, hiking scenic trails, camping at primary use areas, using lakes and streams along with other forms of recreational activities. Minor concern for aesthetics is usually expressed by those people involved with daily commuter driving, hauling forest products, employed in the woods and other commercial uses of the Forest. (U.S. Forest Service, 1974, p. 18).

Identification of concern is a subjective judgment based on whatever data on travel and recreation participation are available for specific forest land areas.

Once the Sensitivity Levels for particular viewing places have been identified they are entered on the same base map that is used for Variety Class determination. This involves identification of all travel routes, specific use areas and water bodies on the map. Then an overlay is prepared showing the land areas that can be seen from these viewing places. Three distance zones are identified for land seen from each viewing place: Foreground, Middleground and Background. Each distance zone is labeled with the Sensitivity Level number for that viewing place. Overlays for each viewing place are then assembled and compared. To avoid conflict between classifications resulting from different distance zones and Sensitivity Levels, the more restrictive Sensitivity Levels are used in the final overlay.

The Sensitivity Level overlay is combined with the Variety Class overlay to determine the Visual Quality Objectives for particular forest land areas. Approximately equal weight is given to Variety Class and Sensitivity Level in determing the degree of alteration of naturally appearing landscapes that is acceptable. Visual Quality Objectives establish visual goals equivalent to goals for wood, water, forage, wildlife and recreation, and are used as input for Multiple Use Planning and Decision-Making Process.

A.2. Research Needs: Public Concern for Landscape Quality

There are several problems with existing procedures for assessing people's concern with the visual quality of forest lands. These problems stem from the ambiguity in the definition of visual resources. Lacking is clear specification of the attributes which constitute the visual resource. Natural resource inventory and management require explicit definitions of those attributes of objects in the environment which are valued by society. Timber resource inventory and management depends on clear specification of board foot or cubic foot units of particular quality, while range resource inventory and management requires specification of biomass per acre in particular species and condition classes of grasses or forbs. Unfortunately, the attributes of objects valued for visual appreciation seem to be neither as universal nor as stable as attributes valued for timber, range, water, and wildlife uses. Attributes important to outdoor recreation are also very difficult to specify because they vary with individual and social values as well as with multiple recreational activities.

Scenery, or visual quality, has been defined as an experience resulting from the interaction of a viewer with particular values and knowledge and a landscape with particular objects and attributes (Craik, 1970). Thus, while the beauty of forest landscape is not entirely in the eye of the beholder, it is also no determined unilaterally by the physical structure of the environment. Existing procedures for assessing viewer concern do not account adequately for how variation in individuals and social groups or variation in the structure of the physical environment contribute to individual judgments of visual quality.

Existing procedures mention recreational users, tourists, and forest workers as the primary viewers for assessing concern. There is no justification for this classification of social groups, nor is there justification for not including other social groups -- environmental and industrial interest groups, potential user groups, and other social groups that may become concerned with the visual quality of forest lands. Also lacking are procedures for identifying the concerns of the social groups that are mentioned. However, the most serious deficiency is the absence of any procedures for linking various social groups to physical attributes that vary with management practices. Any assessment of viewer concern will be unclear if the things people are concerned about are not identified.

Much ambiguity in exisiting procedures for assessing sensitivity is due to an underlying assumption, implicit in the procedures, if not in the minds of those who apply the procedures, that visual quality can be defined on the basis of the degree of change in a naturally appearing landscape. Landscapes which appear less characteristic of natural forest areas in the surrounding region as a result of logging, roadbuilding, powerline clearing, and other physical manipulations are generally thought to stimulate greater viewer concern. This assumes that viewer judgments of deviation from characteristically natural landscapes are universally negative -- an assertion that a restricted set of social values and physical attributes alone determine the quality of forest scenes. This assumption stands in the way of an empirical assessment of scenic quality as an interaction of viewer and environment. Change in "natural" forest landscapes has not been established as a universally negative occurance. Particular changes may be evaluated negatively by certain social groups, but judged neutrally or positively by other groups.

These problems in defining visual resources point out needs for research. First, there is a need to discover how individuals perceive and interpret forest landscapes. What attributes of objects in the environment do people see, and how do people value those attributes? What sorts of meanings do people assign to the forest environment? Second, there is a need to group individuals into publics based on what they see and how they value visual attributes. Previous research has shown that judgments of scenic quality vary with personality factors as well as with social values or meanings (Craik, 1968; Zube, 1974).

To improve VMS, it makes more sense to group individuals on the basis of shared meanings or values, since it is easier to identify social groups and the meanings they share than it is to identify personality variations among forest viewers. Finally, there is a need to link publics with the visual environment by identifying the attributes of objects in the environment that are of concern to various publics and by assessing the intensity of the publics' concern with particular attributes.

A.3. Sensitivity Levels in the Visual Management System

Existing procedures treat viewer concern as something that is largely independent of the actual environments displayed. It is assumed that people hold universal values or standards which determine their perception, interpretation and evaluation of forest lands. Sensitivity Level is thought to be a measure of that "abstract" concern for natural beauty, and, once determined, can be applied to landscapes undergoing a variety of modifications.

However, since scenic quality arises from an interaction between a viewer and an environment, the physical attributes resulting from modifications

may have a substantial influence on viewer concern for the scenic quality of forest landscapes. An individual may have very different feelings about clearcuts and ski-runs, even though the physical modifications of the landscape are similar, simply because he or she associates very different meanings with these manipulations. Thus, the purpose, or meaning, of the change in a landscape appears to have a great deal to do with viewer concern. Present procedures do not provide for an assessment of how viewer concern varies with management alternatives. Viewer sensitivity may be so dependent on the content of management alternatives that Sensitivity Levels can only be assigned when specific alternatives are displayed as part of the land use planning process. An investigation of the dependency of viewer concern on management alternatives is necessary to validate any recommended changes in procedures.

APPENDIX B

RESEARCH METHODS

Research on human concern for the scenic quality of forest landscapes was conducted in several phases. The first phase was a comprehensive review of the literature on landscape perception and evaluation. The second phase was a case study on the Mount Hood National Forest in Region 6. The third and final phase was used to translate findings from the case study into a methodology for assessing public sensitivity to forest landscapes.

B.1. Literature Review

The first step in this study was a comprehensive review of literature dealing with landscape perception, interpretation and evaluation. Emphasis was given to items dealing with theory and method appropriate for investigation and improvement of the sensitivity level portion of the Visual Management System (VMS). Literature was grouped into three classes: landscape as a resource, landscape perception and preference, and the symbolic nature of landscapes and public images.

B.2. Case Study on Mount Hood National Forest

Results from the literature review showed that few studies had investigated how people in various social positions perceive and interpret forest landscapes. A case study was designed to describe and compare judgments of landscape quality by forest visitors, residents of local communities and urban interest groups. The study was entirely qualitative, with the purpose of describing the meanings people from different social groups projected onto landscapes. It was expected that this procedure would help to formulate a method for identifying publics concerned with the scenic quality of forests.

Qualitative data were gathered by means of participant observation with several populations. In this instance, participant observation involved the combined use of interviews, direct observations of behavior, and analysis of documents. Data were gathered from participants in the following populations and settings:

1) Recreational visitors at campgrounds, dispersed recreational sites, wilderness trails and Timberline Lodge at Mount Hood;

2) residents of Zigzag, a community dependent on tourism and adjacent to Mount Hood's ski developments;

3) residents of Estacada, a timber-dependent community on the west edge of Mount Hood National Forest;

4) members of various environmental interest groups in Portland, Oregon; and

5) representatives of various forest industries in Portland, Oregon.

Participants in these settings were asked a number of questions to solicit in their own words knowledge and concern regarding the use of the Mount Hood National Forest. Every attempt was made to discover the meaning people associated with various places and activities on the Forest. A variety of projective techniques were used to elicit attitudes toward forest scenery that people were not able to verbalize in a direct interview. People were shown water-color paintings and colored photographs of managed forest lands and asked to talk about what they saw and how they felt about various features.

Qualitative data were analyzed by searching for the knowledge, values, and meanings of forest landscapes shared by particular social groups. Once identified, these meanings were used to describe various publics on the basis of their perceptions and interpretations of forest landscapes. This procedure provided descriptions of the meanings that could be used for revising existing procedures or for undertaking further research.

B.3. Development of a Methodology for Assessing Public Sensitivity to Forest Landscapes

The results from the case study were used to develop a methodology for assessing public sensitivity to managed forest landscapes. Since analysis of qualitative data failed to reveal physical attributes of universal value for most subjects, the process by which viewers imputed social meaning to landscapes was identified as the key to understanding viewer concern. Data were analyzed further to reveal how various social meanings were used to interpret and evaluate forest scenes. A consistent set of attributes for defining a visual resource could not be found. The physical attributes valued in a particular scene varied with the meaning people associated with the landscape of which the scene was a part. This discovery required a complete re-examination of the approach to defining viewer concern with landscape quality, since it was not possible to define visual resources in the same way that commodity resources were defined. (A complete discussion of social meaning and its role in judgments of landscape quality is presented in Appendix C.)

A taxonomy of publics was developed so that social meanings could be linked with particular social groups. Attention was given to the content of these meanings as well as to the process by which they arise and change. The taxonomy can be used as a guide for simplifying decisions regarding which social groups to include in Sensitivity Level analysis. (This taxonomy is presented in Appendix C.)

APPENDIX C

RESULTS: THE SOCIAL MEANING OF MANAGED FOREST LANDSCAPES

Results from research on public concern with the visual quality of forest landscapes are discussed in two sections. The role of social meaning in viewer judgments of scenic quality is discussed first. This is followed by a description of methods for classifying publics on the basis of their exposure to forest landscapes.

C.1. The Social Meaning of Forest Landscapes: The Basis for Viewer Concern

The most important result from this study is a new conception of the process by which viewers judge scenic quality. Analysis of qualitative data revealed that the process by which viewers judge forest landscapes is far more complex than simply applying an abstract standard of judgment. Little support was found for the assumption that viewers approve or disapprove of landscapes by using a general standard alone. Most importantly, while the naturally appearing landscape was valued by many people, it seldom constituted a universal standard for determining judgments of landscape quality. These results eroded support for assumptions underlying existing procedures for determining Sensitivity Levels in the Visual Management System. Therefore, the basis for viewer concern with the visual quality of forest lands was reconceptualized.

Transcripts of interviews and other qualitative data show that people judged the quality of forest landscapes by a process similar to that used to judge forms of artistic expression. When engaged in the appreciation of visual arts, a viewer will ask, "What is the artist trying to do? What does he or she seek to convey?" When the meaning of the work in question is understood, the viewer may express feelings of approval or disapproval, like or dislike. If viewers disapprove, but feel unsure about that judgment,

they question whether they have understood the intentions of the artist, not whether they have applied the right standard of judgment. Judgments of artistic value are frequently distorted when an abstract formula is used to judge aesthetic quality (Richards, 1949; Newton, 1951). People tend to search for meaning in works of art instead of unilaterally imposing meaning on the artform.

When judging forest landscapes, people asked repeatedly, "What is going on here? What made the forest look this way?" They sought to explain or make sense of what they saw in an actual landscape or photograph. Features of the landscape were not meaningful simply because of visual properties such as form, line, color and texture. Meaning was not a property of the features themselves. Instead, a landscape was meaningful because the features conveyed information on why the landscape had a particular appearance. Once people had sought for information, regardless of whether they were successful, they usually expressed feelings of approval or disapproval.

The distinction between meaning and affect was used to develop a conceptual scheme for typifying viewer experiences of scenic quality. Figure 2 illustrates four idealized kinds of landscape experiences based on this distinction. The term legibility refers to whether people can decipher what is going on in a landscape by observing its features -- landscapes judgments of an effective nature are based on either legible or illegible meanings. The affective judgments refers to whether people like or dislike a particular landscape, whether they approve or disapprove of what they see.

		MEANING: ILLEGIBLE	MEANING: LEGIBLE
AFFECTIVE JUDGMENT: DISLIKE		Chaotic Landscape	Unacceptable Landscape
AFFECTIVE JUDGMENT: LIKE		Sensual Landscape	Purposeful Landscape

(What is going on here?)

Figure 2. Four kinds of landscape experiences that are possible when meanings are distinguished from affective judgments.

Landscapes which are illegible and disliked will appear choatic, or disorganized, to the viewer, and can be termed chaotic landscapes. Viewers who could not decipher timber harvesting operations and disliked the features created by timber harvesting uniformly expressed a sense of discomfort, but were not able to explain their judgment of dislike. They simply did not like what they saw.

Correspondingly, landscapes which are illegible, but liked, provide a pleasant sensation for the viewer, and can be termed sensual landscapes. Many viewers could not make much sense out of why a landscape looked as it did, but derived pleasure from viewing the physical features themselves. Colors and forms were valued because they "looked beautiful".

When people can understand what is happening in a landscape, but dislike what they see, we may refer to an unacceptable landscape. Many viewers could decipher timber harvesting in a landscape and expressed their disapproval in very clear terms. These viewers were able to supply reasons for the unacceptability of the landscape. There were several

sources of unacceptability. First, viewers often accepted the land uses they had deciphered correctly, but made a negative judgment of the way in which manipulations had been done. Timber harvesting, particularly clear-cutting, was frequently disliked because of the lack of visible regeneration, soil erosion, or a failure to clean up after harvesting was completed. A second source of unacceptability was viewer disagreement with the location of particular land uses. Viewers frequently disapproved of clearcuts, or any sort of timber harvesting, adjacent to highways or campgrounds. A final source of unacceptability was viewer disagreement with the use to which the land had been put. Many viewers felt that timber harvesting, particularly clearcutting, was an inappropriate use of national forest lands. Most of these people expressed a preference for the preservation of forest lands for undeveloped recreational uses.

Finally, landscapes which are legible and liked will appear to be pruposeful to the viewer, and may be termed purposeful landscapes. Most viewers who were able to see that a land area was being used for growing timber, because of the presence of young trees and evidence of prior timber harvesting, expressed a positive feeling if they accepted both timber production as a use of national forests and the location of the harvested area. Viewers frequently became very excited about the "regeneration" and the "growth" of a new forest. Viewers had similar feelings about the purposeful use of other lands for wilderness or recreation.

Viewers expressed a preference for landscapes in which people could identify clear purposes. Chaotic landscapes were by far the most uncomfortable, since they were threatening to the viewer's sence of orderly

experience. The propensity for order or clear definition in landscapes was the strongest theme expressed in interviews. Many "naturally appearing" landscapes were valued because they were "ordered" by nature.

The primary conclusion from this investigation of viewer concern is that people's experience of scenic quality is indeed the result of an interaction between viewer and environment. The environment contains information in its physical attributes. People search for meaning in the landscapes by attempting to decipher the information content. People apply their own values, knowledge and standards when judging whether they like or accept the meaning they decipher. Thus, in order to assess viewer sensitivity, it is necessary to know what information is available in the landscape, how people interpret that information, and the values and standards they apply when making judgments.

The planner can anticipate the information that will be available in a particular landscape by listing management alternatives developed in the land use planning process. This will identify the attributes to which the viewer will seek to assign meaning. Identification of site specific land management alternatives thereby becomes a necessary step in determining Sensitivity Levels.

The next step in determining Sensitivity Levels is to develop a method for identifying publics, both on the basis of their ability to decipher landscapes and their values and standards when making judgments.

C.2. Classification of Publics

The role played by people when viewing a landscapes will influence their interpretations and evaluations of a scene. Thus, there will very likely be less of a difference between aesthetic judgments by a logger and banker when both are camping with their families than between the logger when he is at work in the forest and when he is relaxing with his family. The logger may interpret a stream as an obstacle to efficient timber extraction when engaged in a harvesting operation, but will likely assess it for its scenic qualities when driving for pleasure. A taxonomy of publics was developed to help identify the primary sorts of roles played by people who are or may become concerned with the scenic quality of forest lands. This approach to typifying social groups is obviously a first step toward a more sophisticated methodology. However, it does serve as a guide for identifying salient publics and provides justification for restricting Sensitivity Level analysis to people who view the forest directly.

In studying how social roles are influenced by the communications process, social researchers have found it useful to distinguish between people who gather information directly form the environment and those who rely on an agent to select and transmit information through mass media (Westley and Maclean, 1957). This distinction can be used to typify the roles people play in relation to forest lands and the ways in which this influences their interpretations and evaluations of forest scenes.

Two sorts of publics have direct contact with forest lands: special interest publics and user publics. Special interest publics may be defined as a group organized to secure certain objects which members value

or regard as beneficial to themselves. These publics coordinate the actions of their members by formal organization and face-to-face communication. While not all members of a special interest public may have contact with forest lands, the organization uses its own highly trained experts to gather information about the environment. Examples are the Sierra Club, Wilderness Society, National Forest Products Association, Cattleman's Association, and formal off-road vehicle organizations.

User publics are defined as aggregates of individuals who share common interests because they participate in the same uses of wildlands. They lack formal organization and communication between members. Each member has direct contact with the forest environment and obtains the majority of information about the environment by using it. Examples of recreational user publics are hikers, campers, snowmobilers and skiers. Examples of consumption-oriented user publics are huckleberry pickers, loggers and other woods workers, wood gatherers and hunters. Formally organized groups of campers, hikers or other recreational users would be considered special interest publics.

A third kind of public obtains information about forest lands indirectly through mass media. This mass public is defined as aggregates of individuals who share knowledge and common interest because they obtain information from the same medium or obtain the same information from different media. Members of mass publics are not organized formally and do not communicate with one another as members, aside from their influence on the media. Readers of magazines such as Field and Stream, people who watch television programs or commercials dealing with forest lands, and people who obtain information about forests from newspapers are examples of people who are members of mass publics.

A fourth kind of public has no interest in forest lands, and does not obtain information on forest lands directly or indirectly through agents in the media. Here we may refer to potential publics who may later become interested in using or obtaining information about forest lands. This public is not synonymous with the "silent majority", since the latter is a rather vague concept covering all publics that do not exert political influence. The distinction between user, mass and potential publics has far more utility for the decision maker than the concept of "silent majority".

It is important to keep in mind that these publics are defined by the roles individuals play when processing information about forest lands. As stated above, we are interested in the social meanings associated with a landscape, not with the individual as a unique person. A particular individual may be a member of two or more of these publics, yet will be influenced in the judgment of a landscape by the role played at a particular time and place. This was illustrated by the example of the logger at work and play.

Yet, since almost all individuals watch television, read magazines, and listen to radio, they are members of mass publics. Some of the information they acquire from mass media is influenced by agents of special interests publics who seek to broaden public support for their interests in public lands. It seems likely that public consciousness of national forests is shaped by mass communications. Thus, the mass media to which people are exposed will have some influence on their ability to decipher landscapes and to make effective judgments regardless of the other publics to which they belong.

This method for typifying publics raises two questions for the Visual Management System. First, which publics should be used when determining Sensitivity Levels? Second, should the Forest Service utilize mass communications to influence the information and values of forest viewers?

Existing VMS procedures require that Sensitivity Levels be based on recreational users, tourists, and people working on a forest or engaged in commercial activities. All of these people are members of user publics, and, as such, are unorganized aggregates of individuals who usually exert very little political influence and are not demonstrative in making known their preferences for scenic quality. Yet despite the fact that these people constitute the majority of viewers on forests lands, the strongest political influence is exerted by special interest publics and members of mass publics who are influenced by agents of special interests through mass media. In addition, VMS procedures do not incorporate the concerns of potential publics and mass publics who do not voice their opinions.

None of these publics act solely as an advocate for visual resources. Aside from landscape architects, there are no visual resource interests corresponding to the commodity resource or recreational resource interests. The special interest publics, and members of mass publics influenced by them, act collectively or individually to influence land use decisions. They affect visual resource decisions indirectly by influencing land uses. Since visual resources seem to lack an identifiable constituency, Sensitivity Level determination can be simplified by focusing on user publics -- the social aggregate containing the people that will view landscapes directly, but who are not engaged in a role of attempting to secure particular land use interests. This approach makes the on-site viewers the primary

clients. It would provide an equitable method for assessing viewer concern if representative samples of user publics present on forest lands were used to develop Sensitivity Levels. A wide spectrum of knowledge and values would be represented, since many members of user publics would be influenced in their judgments by membership in special interest publics and mass publics, as well as by the specific user role they may play.

A complete answer to the question of whether the Forest Service should utilize the mass media to influence viewer judgments of landscape quality would require a discussion far more lengthy than space permits here. However, it is sufficient to point out that many viewers lack the knowledge necessary for deciphering forest landscapes and making appropriate judgments. The Forest Service might consider using mass media, as well as on-site media and agents, to interpret the uses of national forests. People seek meaning in forest landscapes, and are frequently frustrated and confused because of their inability to decipher correctly. An opportunity to communicate the purpose of forest land management through the information contained in physical features is lost when people react negatively to perceived disorder or "destruction".

APPENDIX D

RESULTS: REVISED PROCEDURES FOR ASSESSING PUBLIC SENSITIVITY

Results reported in Appendix C have been used to develop the following recommended revisions in procedures for assessing Senstivity Levels in the Visual Management System:

1) Sensitivity Level should be redefined as a measure of viewer interpretations and evaluations of particular forest landscapes.

2) The first step in the process of determining Sensitivity Levels for a land area should be to array existing and proposed alternative land uses that influence physical attributes and the positions from which these attributes can be viewed.

   This would require the integration of Sensitivity Level analysis with land use planning, so as to permit evaluation of landscapes in terms of land use practices on a site specific basis. A series of base maps identical to those used in Variety Class determination should be prepared to display existing and proposed alternative land uses, silvicultural systems, roads, recreation use areas, trails, and water bodies. The map of existing conditions would serve as a baseline for measuring changes in Sensitivity Levels or Variety Classes that would result from alternative land uses.

3) The second step in determining Sensitivity Levels should be identification on the base maps of existing and proposed alternative viewing contexts (travel routes, trails, use areas, and water bodies).

   The classification of viewing contexts on the basis of primary and secondary importance should be eliminated.

4) The third step in determining Sensitivity Levels should be preparation on overlays of all seen areas from the viewing contexts identified for existing and proposed alternative uses. If computer programs do not permit inexpensive determination of seen areas for each overlay, then the existing procedures for classifying primary areas should be used to reduce costs of delineating seen areas.

5) The fourth step in determining Sensitivity Levels should be to identify distance zones of foreground, middleground, and background for seen areas delineated in step three. Existing procedures for defining distance zones are adequate for purposes of delineation on each overlay.

6) The fifth step should be to assign Sensitivity Levels to land areas delineated on the overlays, utilizing existing procedures for designating a Sensitivity Level for each distance zone.

Actual Sensitivity Levels should be developed empirically for each national forest, or for several national forests in a homogeneous socio-cultural region. Sensitivity Levels should be determined for each combination of viewing context, distance zone, and dominant land use feature on the basis of the following characteristics of user publics generally present in each viewing context: type of user public, proportion of user publics of each type, and the interpretations and evaluations of dominant land use features by major types of user publics.

Once Sensitivity Levels have been developed for a forest or region, they could be applied by use of the Matrix illustrated in Figure D-1. Viewing context and distance zones should be located on the horizontal axis. Then the dominant land use features that can be seen from the viewing context in each distance zone should be located on the vertical axis. The cells of the matrix at the intersection represent the integration of information gathered in steps one through four and contain the appropriate Sensitivity Level. As is the practice with existing procedures, conflicting Sensitivity Levels should be resolved by choosing the most restrictive level.

7) Existing procedures for integrating Sensitivity Levels with Variety Classes should remain unchanged.

These recommendations represent the current stage in the development of a methodology for assessing public concern for the scenic quality of forest lands. More research is needed to refine a method for developing Sensitivity Levels appropriate for forests or regions. Investigations currently underway will validate some of the steps in that method, but additional study will be required before the method is applicable generally.

These revised procedures reduce the number of subjective judgments in Sensitivity Level determination, and provide a more flexible process for comparing alternatives and measuring changes in landscape quality. The method for developing Sensitivity Levels appropriate for forests and regions will very likely still contain some subjective judgments. However, agency experts, outside reviewers, and even public involvement could be used to develop appropriate Sensitivity Levels for a forest or region. This would make remaining subjective judgments open and accountable.

Figure D-1. Matrix for Determining Sensitivity Levels

DOMINANT LAND USE FEATURES SEEN FROM VIEWING CONTEXT	VIEWING CONTEXTS																	
	TRAVEL ROUTES									RECREATION USE SITES								
	MAJOR HIGHWAYS			SECONDARY ROADS						CAMPGROUNDS			DISPERSED CAMPS					
	FG	MG	BG	FG	MG	BG				FG	MG	BG	FG	MG	BG			
TIMBER HARVESTING																		
Clearcutting	1	1	2	1	2	3												
Shelterwood	1	3	3	2	3	3												
Selective Cut	2	3	3	2	3	3												
ROAD BUILDING	1	1	2	2	2	3												
DEVELOPED FACILITIES	1	1	2															
MINING																		
Open Pit	1	1	1	1	1	2												
Shaft																		
RECREATION																		
Campground																		
Trails																		
Ski-run																		
Lift-Line																		
etc.																		

APPENDIX E

COMPREHENSIVE LITERATURE REVIEW - 1974

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Literature Review of Analysis Methods Appropriate for Investigation and Improvement of the Sensitivity Level Portion of the U.S. Forest Service Visual Management System

Within the past ten years or so, in concert with a growing public concern over environmental quality, a significant body of research on the relationship between man and his environment has emerged. The results of this research, which have appeared in book form or as articles in a wide variety of journals, is long on initiative and stimulating ideas but short on organizations and consensus. The field is amorphous. There is a lack of rigor and systematic vision both in terms of experimental research and in relation to how research findings might be applied to the needs of environmental planning and decision making. A solid theoretical basis for research in man-environment relations simply does not exist.

It would appear, however, that headway is being made, and the field may be, according to David Lowenthal, ". . . on the threshold of significant generalization." For certain, the proper questions have been delineated and a number of analytical tools have been developed. By becoming operationally cognizant of the findings to date as they relate to landscape management on the national forests, the Forest Service can most certainly benefit.

Pursuant to the objectives of our joint project, we have conducted a systematic and relatively complete (we will be continually adding to the bibliography as the project progresses) review of the man-environment literature with specific emphasis on those items dealing with theory and method appropriate for investigation and improvement of the sensitivity level portions of the Visual Management System.

Landscape as a Resource

Perhaps the most solidly founded and significant fact to emerge from the scientific literature on landscape perception is simply that the visual landscape is a resource and as such may, at least in part, be inventoried, evaluated, and managed much like any other natural resource. That this fact has been validated and accepted publicly as a social need gives added credence to the notion and explains why we are involved in this project in the first place.

The literature that deals with the process of landscape inventory and classification comes primarily from the landscape architecture and design disciplines. The primary focus here falls clearly on the physical environment. The landscape observer is always at least implicitly alluded to but no real social or psychological variables are considered.

The theoretical underpinnings of this work is design-intuitive or ecological. It is believed that an objective standard for categorizing the landscape can be enumerated and a number of visual analysis case studies have been conducted to support this belief.

Landscape Perception and Preference

In an attempt to more systematically relate the landscape as a visual resource to the perception and preference of observers, a number of authors, working primarily from a psychological perspective, have taken a dual component viewpoint which includes characteristics of the physical environment as well as characteristics of the perceiving individual.

It is in this area that most of the literature reviewed falls, and it is here that the lack of consensus in both method and findings is most prevalent.

Rachael Kaplan shows how basic the problem is when she asks: "What shall we assess? What are the salient aspects of the environment? For whom are they relevant?" Most studies are trying to sort out these issues. Some start with an environmental classification system borrowed from the design literature and try to ascertain the objective validity and universality of the dimensions and the hypothesis behind them. Others want to identify specific objective characteristics of the landscape which relate to preference ratings. In either case, the experimental method used usually involves showing photographs to students and/or professionals and asking for questionnaire responses and evaluations. Little research has been done in natural settings and no real effort to identify relevant groups of observers has been made.

It is possible to note a general convergence of findings in this area towards the generalization that there do exist relatively uniform and stable aesthetic standards for appraising landscape quality norms among a general population. Such concepts as landscape "naturalness," "complexity," "legibility," "coherence," and "variety" are repeatedly mentioned as positive values of the landscape from the point of view of the observers.

The theoretical basis for these studies are the psychological principles dealing with personality types, perception, and stimulation levels.

No doubt some important notions can be gleaned from this area of the literature. There definitely appear to be universal perceptual needs and perhaps preferences that can form a basis for building a sensitivity model which includes both observers and the landscape.

Symbolic Nature of the Landscape and Public Images

But the psychological model is a rather static approach that characterizes

the environment basically as a stimulus source and the observer as a responding organism. The observer is seen as responding without conscious awareness and in a mechanical fashion to a sensory signal coming from the landscape. The social meaning or cultural imagery of the scene tends to be discounted. Little concern is given to the symbolic nature of the landscape and the changing and varying public images of environmental quality. And it is this symbolic nature that would seem to be most relevant to the problem at hand. For the social meaning -- the historical and cultural sense that a particular group of individuals makes of an object or event and the subsequent interpretive set that results from this definition -- determines to a great extent the reaction a person has to a particular timber management practice. For example, it seems certain that an individual reacts to a clearcut not only as a stimulus object (it is not clear whether a clearcut increases or decreases variety of stimuli) but also in a conscious, interpretive fashion in which the social meaning of the management practice has an influence on his behavior.

Lucas and others have shown how wilderness users and recreationists come to the site with varying images of the land base, and that this makes a difference in their perception of the resource and the satisfaction that accrues from their visit. And in a recent statement on the social and economic influences on the Beaverhead National Forest, it is pointed out that the differing lifestyles of the users leads to conflicts over resource allocation and management.

It would seem relatively clear that any comprehensive methodology for linking landscape classification standards to changes in the sensitivity of various publics to forest land management practices must include those aspects of the social environment which bear on the issue. And it

is on this subject that the literature we have reviewed is the weakest. In fact there is very little scientific hypothesizing occuring on the effect various management techniques have in creating, reinforcing, or changing the symbolic meanings that various publics assign to the landscape. Or even on the more general social meaning of the landscape per se.

There do exist, however, a number of excellent studies on urban imagery and symbolism. We have reviewed some of these sources, not so much in search of a theoretical base, but more in terms of acquiring some methodological guidelines and a general perspective on the nature and significance of our present undertaking. (The reaction of individuals to natural settings may rest on different principles than in an urban situation.)

In relation to the identification of various publics, there is a fair amount of data in the recreation and wilderness literature on the enumeration of users. These should be most helpful and they will no doubt be utilized a great deal as we proceed.

In conclusion, after a review of the literature, it seems obvious that a great amount of relevant scientific thought has occurred in our general area of interest. There are, however, some serious deficiencies in relation to building an explanatory model for relating publics to landscapes undergoing change because of timber management practices. Fortunately, this was anticipated when our working agreement was formulated and there seems to be adequate time and opportunity to do some on-site investigation and theorizing in the form of a case study, which will hopefully contribute positively to our scientific understanding and to the improvement of Forest Service management techniques.

SELECTED REFERENCES: ITERATION I

1. Landscape: the Visual Resource

Key Sources

Crowe, Sylvia, Forestry in the Landscape, Forestry Commission Booklet No. 18, HMSO, London: 1966.

A short booklet that presents certain design guidelines for aforestation and harvesting programs. While certain general principals are given as guidelines, the essential point is that each forest should be considered on its own merits.

Crowe, Sylvia, Shaping Tomorrow's Landscape, Djambatan, Amsterdam: 1964.

A collection of presentations dealing with the role landscape architecture has to play in conservation.

Leopold, Luna, "Landscape Esthetics," Natural History, Vol. 78, Oct., 1969, pp. 36-45.

The author presents a model for objectively quantifying the scenic quality of a river valley. It attempts to measure landscape appeal without relying on dollar values or sentimental worth. A total uniqueness value scale which measures three types of factors -- physical, biological & water, and human user interest -- is put forth and used to compare a number of different river valleys. Also an example of how certain factors such as scale of river character, scale of valley character, and scenic outlook can be selected and used in various combinations to express certain aspects of a landscape's characteristics is enumerated.

Litton, R. Burton, "Aesthetic Dimensions of the Landscape," Natural Environments, Drutilla (ed.), Resources for the Future, 1972, pp. 262-291.

A statement of the landscape as a resource and an attempt to develop some tangible means of responding to it. In looking for a system of landscape identification and description that enjoys common reliability across a broad range of observers, the author divides the generalized attributes of the landscape into factors of recognition and compositional types. Aesthetic criteria for measuring quality are given.

Litton, R. Burton, Forest Landscape Description and Inventories, USDA Forest Service Res. No. PSW-49, Pacific Southwest Forest and Range Exp. Stn., Berkeley: 1968.

A descriptive taxonomy of the natural landscape. The landscape is considered as a visual, physical entity which has an aesthetic value. Six descriptive factors as they affect the observer as he looks at the landscape are presented. Recognition of compositional types that occur in the landscape provides a visual framework for observation and inventory.

Litton, R. Burton, Landscape Control Points, USDA Forest Service Res. No. PSW-91, Pacific Southwest Forest and Range Exp. Stn., Berkeley: 1973.

As a means of predicting and monitoring the visual impact of alterations to the landscape, landscape control points -- a network of permanently established observation sites -- are put forth. Criteria for LCP's affecting their location and use involve relationships to roads, trail, air routes, areas of concentrated use, overview covering landscapes of special value. A five step procedure for the visual analysis of the landscape is delineated.

Litton, R. Burton and Robert H. Twiss, "Resource Use in the Regional Landscape," Natural Resource Journal, Vol. 6, No. 1, Jan. 1966, pp. 76-81.

The authors propose that four characteristics of the landscape -- nature, beauty, meaning, and imageability -- which result from an interaction between people and the resource base can be used as criteria for management.

Snow, Kathleen Jeanne, Visual Analysis: A Comparison of Methods for Classification and Evaluation of Landscapes as Aesthetic Resources, unpublished Master's Thesis, U.C. Berkeley: 1973.

A comparison of a number of the "well known" methods for classifying and evaluating landscapes. The paper examines the process of visual analysis and clarifies the essential steps involved. The various techniques are reviewed in light of their scope, purpose, limitations and possible biases. The selected methods are tried on a sample site (Tomales Bay, California).

Twiss, Robert H., "Conflicts in Forest Landscape Management", Journal of Forestry, Jan., 1969, pp. 19-23.

Forests are becoming more visible and thus a large segment of the public is judging forestry and land management on the basis of what they see. Landscape conflicts are caused by the differences in values accruing from the forest landscape. Foresters generate conflict when they overlook or depreciate other people's value and points of view. The author suggests that the design process is a professional approach to resolving conflict. He believes that design infuses human sensory experience into otherwise cold and impersonal decisions. Design considers not only production variables but proportion, volume, shape and linkage between human activities. Design treats forests not only as a resource but as a place, an environment. Design, however, needs direction in terms of production and in terms of natural ecology.

Supporting Sources

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II. Landscape Perception and Preference

Key Sources

Appleyard, Donald, "Why Buildings are Known," Environment and Behavior, Vol. 1, No. 2, 1969, pp. 131-156.

Nearly two hundred buildings were each scaled by trained urban designers for the presence of form, visibility, use and significant attributes. These scalings were then correlated with recall frequencies on three tests by a large indigenous sample group. Patterns of form, visibility, use, etc. were not congruent. Inhabitants' operating and general knowledge failed to coincide. The evidence suggests that the planner and designer should be aware of the individual's and the public's distinctive, visible, used, and significant environments. These should be systematically analyzed and designed if this knowledge of city inhabitants is to be effective and significant.

Appleyard, Donald; Lynch, Kevin; Myer, John R., The View from the Road, M.I.T. Press, Cambridge: 1964.

This paper deals with the esthetics of urban highways: the way they look to the driver and his passengers, and what this implies for their design: the problem of designing visual sequences for the observer in motion. Although experiences varies with users (tourist, commuter; driver/passenger), the most powerful experiences occur when space, motion, orientation, and meaning reinforce each other -- when a landmark that is rooted in community history is the visible goal of a journey the basic artistic problem of the highway is the shaping of its sequential form. The principal objectives in shaping the highway visual experience are to 1) present the viewer with a rich, coherent sequential form, 2) clarify or strengthen the

driver's image of the environment, 3) deepen the observer's grasp of the meaning of his environment.

Calvin, James S., et. al., "An Attempt at Assessing Preferences for Natural Landscapes," Environment and Behavior, Vol. 4, No. 4, Dec., 1972, pp. 447-470.

This investigation was concerned with the problem of assessment of landscape scenery by human observers. Fifteen photographs of natural landscape scenes were rated on each of twenty-one semantic differential scales by college students. A principal components analysis suggested that there may be two major dimensions which people use in their subjective assessment of scenery. The first was labeled natural scenic beauty; a basic factor in preferences for natural scenery appears to involve the location of a scene along a dimension from beautiful to ugly. A second dimension appears to be a natural force factor; some scenes are regarded as tranquil, others as powerful.

Coughlin, Robert E. and Goldstein, Karen A., The Extent of Agreement Among Observers on Environmental Attractiveness, Regional Science Research Institute Discussion Paper No. 37, Philadelphia: Feb., 1970.

Findings based on the responses of a small group of judges to photographs showed a substantial level of agreement on environmental attractiveness. Differences in scenes were found to be more important than differences in opinion among judges. A preference for natural as opposed to suburban-urban environments was reported.

Coughlin, Robert E. and Rabinowitz, Carla B., Analysis of Landscape Characteristics Relevant to Preference, Regional Science Research Institute Discussion Paper No. 38, Philadelphia: March, 1970.

Given the findings (Paper No. 37) on agreement on attractiveness, the authors wanted to identify specific objective characteristics of the landscape which relate to preference ratings. Photos were shown to 10 judges and test results showed a strong tendency towards preference for "parklife" or obviously man-influenced landscapes. Those landscapes with high mean preference were largely synthetic having to do with patterns and balance.

Craik, Kenneth H., "Appraising the Objectivity of Landscape Dimensions," Natural Environment, Krutilla (ed.), Resources for the Future, 1972, pp. 292-346.

An appraisal of the inter-observer objectivity of a comprehensive system of landscape dimensions and an illustration of its scientific application. Three testing techniques -- landscape rating scales, graphic landscape typology, and landscape adjective checklist -- are enumerated. The first two techniques utilize photographs and the latter is conducted in the field. Results of tests given to 250 members of a university

community indicate a substantial consensus of preference.

Craik, Kenneth H., Assessing Environmental Dispositions, Institute of Personality Assessment and Research, U.C. Berkeley.

Environmental dispositions are put forward as a class of assessed personalogical dimensions which include such specific dispositions as person versus thing orientation and wildernism. The author recommends that individual personality assessment be used in combination with unobstrusive observation of activity in natural settings.

Craik, Kenneth H., "Environmental Psychology," in New Directions in Psychology 4, New York: Holt, Rinehart & Winston, Inc., 1970, pp. 1-121.

An appraisal of the prospects for an environmental psychology. Present research approaches and their antecedent development are reviewed. A research paradigm for the comprehension of the physical environment is included. Of special note is a section on the urbanite on tour in which the influence on behavior of role is discussed. An extensive bibliography is included.

Craik, Kenneth H., "Psychological Factors in Landscape Appraisal," Environment and Behavior, Vol. 4, No. 3., Sept., 1972, pp. 255-266.

A review of the landscape surveys and inventories conducted to date (1972). The author differentiates between preferential ratings and evaluative appraisals. And indicates that there seems to exist a relatively uniform and stable aesthetic standard for appraising landscape quality among appraisers that is not too alien to the lay public.

Craik, Kenneth H., "The Comprehension of the Everyday Physical Environment," Journal of the American Institute of Planners, Vol. 34, No. 1, Jan., 1968.

A process model for the comprehension of environmental displays is laid out. The author notes that observers may be grouped according to social variables -- competence, user-client -- or according to personality traits.

Craik, Kenneth H., "The Environmental Dispositions of Environmental Decision-Makers," The Annals of the American Academy of Political and Social Science, Vol. 389, May, 1970, pp. 87-94.

A review of the methods for measuring individual differences in environmental dispositions. The author illustrates the potential usefulness of environmental dispositions for advancing knowledge of the interplay between human behavior and the physical environment. Environmental decision-makers are named as a strategic choice for psychological study.

Daniel, Terry C., et. al., "Quantitative Evaluation of Landscapes: An Application of Signal Detection Analysis to Forest Management Alternatives," Man-Environment Systems, Vol. 3, No. 5, Sept., 1973.

A model is represented that defines esthetic judgement as the joint product of the environment display and the esthetic standards of the observer. The authors believe it imperative to differentiate between the two in this dual compound view and thus signal detection analysis is utilized to reduce ambiguity in the interpretation of judgements. An experiment was conducted which tested whether observers (psychology students) could discriminate realisably among various vegetative treatments and whether observers made differential esthetic responses to the various treatments. Preliminary conclusions indicate that perceived effects of the treatments differed markedly and that less detectable treatments were generally preferred.

Driver, B.L., "Professional Socialization and Environmental Management," in Environment and the Social Sciences, (eds.) Joachim F. Wohlwill & Daniel H. Carson. Washington: APA pp. 265-277.

The author states that the future demands placed on foresters will force them to change their roles and become cognizant of the larger social system of which they are a part. He implicitly hypothesizes that the behaviorally oriented foresters would be more adaptable to the new and increasing demands being placed on environmental managers. The article attempts to determine what educational and experiental inputs have had an affect on changing attitudes and if we should expend the energy in future training programs to change attitudes further. No answers are given but findings show that we must learn more about the professional socialization process, especially how it can be modified and redirected. And it is clear that in addition to his other technical skills, the future forester will need more training in the behavioral sciences.

Fabos, Julius Gy., "An Analysis of Environmental Quality Ranking Systems," in Recreation Symposium Proceedings, Northeastern Forest Experiment Station, Upper Darby, Pa., 1971, pp. 40-53.

A review and analysis of quantitative ranking systems developed during the 1960's. Both evaluative and preferential studies are included. The author concludes that the systems are useful in that they create a myth that emphasizes quality rather than quantity. Problems noted include lack of general applicability, intuitive bias, and inability to predict change.

Fabos, Julius Gy. with Richard Gareaga, Christopher Green, Stephanie Williston, Model for Landscape Resource Assessment, Research Bulletin, No. 602, Department of Landscape Architecture and Regional Planning, University of Massachusetts, Amherst: June, 1973.

This is a comprehensive quantitative model for landscape assessment which includes a component dealing with people's attitudes. Through a survey research questionnaire with 226 respondents representing four

strata (public decision-makers, private decision-makers, household heads, experts) in three sample areas, a landscape favorability coefficient is derived.

Jacobs, Peter and Douglas Way, Visual Analysis of the Landscape, Harvard Univ. Graduate School of Design, 1969.

The paper concentrates on the visual inputs of land-uses on the landscape, and conversely, on the degree to which various landscapes can absorb land-use activities. Three landscape variables -- vegetation density, topographic closure, and visual complexity -- were identified. Thirty subjects were tested by using a paired comparison format to rank photographs. The authors concluded that greater vegetation density and topographic closure absorb visual complexity better than little vegetation density and flat topography.

Kaplan, Rachel, "Predictors of Environmental Preferences: Designers and 'Clients'," in Environmental Design Research, W.F.E. Preiser (ed.), Stroudesberg, Pa.: Dowde, Hutchinson & Ross, 1973.

This study explored two variables -- coherence and mystery -- as predictors of preference for environmental scenes. Preference was studied for individuals who differed in prior training in design-related professions. The two variables were found to be highly effective as predictors. And there was significant difference in preference patterns of students in architecture, landscape architecture, and psychology.

Kaplan, Rachel, "Some Methods and Strategies in the Prediction of Preference," in Landscape Assessment: Values, Perceptions, and Resources, Zube, Fabos, Brush (eds.), 1974.

The author emphasizes that a compact, reliable means of characterizing the visual environment is of great importance. This needs to be accomplished by focusing not only on the salient features of the physical landscape but also on the qualities that are salient for the humans who observe it. A strategy, dimensional analysis, which serves to identify interpretable groupings of physical items is discussed. Insights from this type of analysis indicate that complexity, preference, mystery, and coherence may be predictors of preference.

Kaplan, Stephen, "An Informal Model for the Prediction of Preference," in Landscape Assessment: Values, Perceptions, and Resources, Zube, Fabos, Brush (eds.), 1974.

This paper employs the strategy of starting with preference for the landscape and, with the help of dimensional procedures, working backward, trying to find predictors that both make theoretical sense and are reasonably efficient. Six variables grouped into two categories in terms of the information they provide are presented.

Kaplan, Stephen, "Cognitive Maps, Human Needs and the Designed Environment," W.F.E. Preiser (Ed.), Environmental Design Research, Stroudesberg, Pa.: Dowden, Hutchinson & Ross, 1973.

An integrative framework is proposed which deals with those human needs underlying environmental preference through an extension of cognitive map theory. It is argued on evolutionary grounds that the basic human information processes which the cognitive map makes possible -- recognition, prediction, evaluation, and action -- must be human needs as well as human capacities. The environment which would support such needs is one that meets three essential requirements: It is (1) possible to make sense of (2) novel, challenging, uncertain, and (3) permitting of choice. Both variety and coherence are shown to be essential for each of these requirements.

Kates, Robert W., "Stimulus and Symbol: The View from the Bridge," Journal of Social Issues, Vol. 22, No. 4, 1966, pp. 21-27.

The author suggests a framework for defining research needs in the area of man-environment relations. He states that the central task of the behavioral and social sciences in the study of the environment is to relate the stimulus properties of the environment to their symbolic human manifestations and in turn to define the stimulus properties of the symbolic environment that men create.

Lowenthal, David, "Not Every Prospect Pleases," Landscape, Vol. 12, No. 2, 1962-3, pp. 19-23.

The author discusses the nature of the criterion for scenic beauty. He reviews the various arguments for wilderness. He concludes that the aesthetic definition of the landscape depends on the viewer. What makes one landscape appear harmonious, another incongruous is the entire experience of the viewer.

Lowenthal, David, "Research in Environmental Perception and Behavior," Environment and Behavior, Vol. 4, No. 3, Sept., 1972, pp. 333-342.

Environmental perception and behavior constitute a rapidly growing field of inquiry with inputs from a broad range of disciplines. The volume of new research, the increasingly urgent needs of environmental design and decision-makers, and the multiform backgrounds of collaborating scholars combine to raise serious problems of definition, scope, and application. These and other methodological issues are briefly surveyed, and suggestions are offered for resolving them.

Moeller, Machachlan, Morrison, Measuring Perception of Elements in Outdoor Environments, USDA FJ Research Paper NE-289, 1974.

The authors were interested in trying to determine how people perceive natural environments, how they view other people who use those environments, how they view resource managers. Perception was equated with meaning. And the meanings of 10 concepts that describe elements of natural outdoor environments were measured with the semantic differential technique. Each concept was evaluated on three factors of meaning -- evaluation, potency, and activity. Sixty recreationists were surveyed from each of three use-groups -- campers, picnickers, and wilderness hikers. Similarities and differences were found in the way in which the groups perceived each other and elements of recreation environments.

Newby, Floyd L., "Understanding the Visual Resource," Recreation Symposium Proceedings, USDA, 1971, pp. 68-72.

Understanding the visual resources is a perceptual experience which involves an intricate relationship between what is seen and the individual doing the seeing. It is important to identify those characteristics of a landscape that influence the image formation process. From research conducted in Florida, three major variables were identified that appear to have significant effect upon visual preferences -- visual order, visual complexity, and edge relationships. The interaction of these variables produces spatial definition, which promotes or retards a sense of physical, visual, and psychological access.

Shafer, Elwood L., "Perception of Natural Environments," Environment and Behavior, Vol. 1, No.1, June, 1969, pp. 71-83.

The paper points out some variations involved in spatial and psychological perceptions of natural environments; describes several procedures that may be used to measure perception of those environments; suggests some guidelines for future research in this area. Three approaches -- direct, indirect, factor analysis -- to measuring perceptions are included. The author emphasizes that future research must include social input.

Shafer, Hamilton, and Schmidt, "Natural Landscape Preferences: A Predictive Model," Journal of Leisure Research, Vol. 1, No. 1, Winter 1969, pp. 1-19.

The purpose of this study was to identify what quantitative variables in photographs of landscapes were significantly related to public preference for those landscapes. Ten variables were identified to describe landscape zones. To evaluate preferences, 250 respondents examined 20 packets of 5 photographs each. Using factor and multiple-regression analyses, an equation was developed that used six variables and accounted for 66 percent of the variation in preference scores. The authors concluded that it seems to be possible to quantify aesthetics through the methods described.

Shafer, Elwood L. and James Mietz, "Aesthetic and Emotional Experiences Rate High with NE Wilderness Hikers," Environment and Behavior, Vol. 1, No. 2., Dec., 1969, pp. 187-198.

Results of this study indicate that it is possible to quantify, by means of an attitude scale, a few qualitative values of wilderness recreation. A sample of 152 hikers, 75 percent of whom were professional white collar workers or students, were surveyed in two wilderness areas. The respondents placed primary emphasis on aesthetic and emotional values and comparatively little emphasis on educational and social values. Physical exercise was about half as important as aesthetic values.

Shafer, Elwood L. and William Rutherford, "Selection Cuts Increased Natural Beauty in Two Adirondack Forest Stands," Journal of Forestry, Vol. 67, No. 6, June, 1969, pp. 415-419.

Color photos were used to elicit preferences of five groups of respondents for undisturbed forest stands versus 10 to 12 year old selection cutting areas in Adirondack hardwood and softwood stands. The respondents preferred cut to uncut stands in softwood, but found both equally attractive in hardwood stands.

Winkel, Gary H., Roger Malck, and Philip Thiel, "The Role of Personality Differences in Judgements of Roadside Quality," Environment and Behavior, Vol. 2, No. 2, pp. 199-223, 1969.

This study considers the role which individual differences play in the development of the concept of "environmental personality." Efforts were made to determine whether variations in response to the design quality of selected roadsides could be linked to personality differences which had been identified in studies of experimental aesthetics. The results indicated that deeper levels of personality have little relationship to preference judgements for the roadside. A new personality scale was developed which contained items more directly applicable to the physical environment. Analysis indicated that judgements of roadside based semantic differential scales can be accounted for by a set of relatively direct attitudes toward the design quality of the roadside. One factor, however, was identified which appeared to relate to the broader issue of desirability for complexity and ambiguity in the landscape. This factor was shown to be related to a scale which measures creativity.

Wohlwill, Joachim F., "The Physical Environment: A Problem for a Psychology of Stimulation," Journal of Social Issues, Vol. 22, No. 4, 1966, pp. 29-38.

The author identifies the chief dimensions of stimulation -- intensity, novelty, complexity, temporal change, surprisingness, incongruity -- that are of concern to the student of environmental psychology. He introduces the concept of an optimal level of stimulation which corresponds to a mean adaptation level. And he discusses the question of long term adaptation effects.

Zube, Ervin, "Cross-Disciplinary and Intermode Agreement on the Description and Evaluation of Landscape Resources," Environment and Behavior, Vol. 6, No. 1, pp. 69-90, 1974.

Findings from this study indicate that the extent of agreement between environmental designers and resource managers on the use of descriptive and evaluative terms is generally high. A comparison of data obtained from two modes of inventory and analysis -- ground reconnaisance and office studies employing the use of aerial photography, confirms the findings on cross-disciplinary agreement and supports the use of remote data sources for scenic resource assessment.

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III. Public Images and the Symbolic Nature of the Landscape

Key Sources

Blackburn, Thomas R., "Sensuous-Intellectual Complementarity in Science," Science, Vol. 172, June, 1971, pp. 1003-1007.

An investigation of complementarity as a mode of knowledge and a suggestion that quantitative science and a sensuous alternative based on counterculture epistemology may complement each other and when used together may give a more complete view of nature. A relevant article for those attempting to describe the sensuous landscape in solely quantitative terms.

Bruner, Edward M., "The Missing Tins of Chicken: A Symbolic Interactionist Approach to Culture Change," Ethos, 1973, pp. 218-238.

This paper examines theoretical problems involved in the study of culture change from a symbolic interactionist perspective. It deals with psychological concomitants of rapid change, and although it uses as illustrative material field data gathered among the Toba Batak ethnic group of Sumatra and among Native Americas, the paper has relevance for the study of urbanization in all rural areas.

Lucas, Robert C., Visitor Reaction to Timber Harvesting in the Boundary Waters Canoe Area, Res. Note LS-2 Lake State Forest Exp. Station, St. Paul, Minnesota.

Visitor reaction to the timber cutting policy in the Boundary Water Canoe Area (a wilderness area) is presented. The logging was done on a restricted level designed to maintain primitive travel conditions. There were a number of no-cut zones along waterways and in other strategic aesthetic zones. 82% of the visitors did not notice the logging and of those that did only 30% were bothered by it. The author concludes that conflicts between different types of recreation may be a more serious problem than conflicts between recreation and other uses.

Lucas, Robert C., "Wilderness Perception and Use: The Example of the Boundary Waters Canoe Area," Natural Resource Journal 3 (3), pp. 394-411, 1964.

An article based on the premise that resources, especially recreational ones, are culturally perceived and defined rather than being physically defined. In a study, three aspects of wilderness perception were looked at: the importance of the area's wilderness qualities as an attraction, the area considered wilderness, and the amounts and types of use considered appropriate in the wilderness. Great differences in wilderness views were found but the variation was greatly reduced when visitors were classified on the basis of the type of recreation they were engaging in. These findings give credence to the concept of semi-wilderness as a management technique for protecting wilderness areas and for satisfying visitors who may want less than the real thing.

Lynch, Kevin, The Image of the City.

The classic work on the imageability of the urban environment. The book asserts that legibility is crucial in the city setting and analyzes this fact in detail with three case studies. Although the analysis limits itself to the effects of physical, perceptible objects on imageability, implicitly throughout the text and in an appendix, the author discusses other influences, such as the social meaning of an area, its public image, its function, its history, etc.

Marlowe, D. and K.J. Gergen, "Personality and Social Interaction," in The Handbook of Social Psychology, G. Lindzey and E. Aronson (eds.), 1969, pp. 590-665.

An overview of the field and review of the basic research methods and findings in the role of personality in social interaction.

McEvoy, James III, "The American Concern with Environment," in Social Behavior, Natural Resources and the Environment, Burch, et. al. (eds.), 1972, pp. 214-236.

An analysis of current public concern with environment and a review of the writings on nature and the American. Findings drawn from surveys given by others show that in general, it is the more affluent, better educated and younger segment of the population that is most concerned about problems of the environment. A broad support for increasing the amount of public land devoted to conservation in the form of parks, wildlife refuges, and the like was found. But the data reviewed had little to say about possible value and attitude changes in the general public orientation to environment.

Means, Richard L., "Public Opinion and Planned Changes in Social Behavior: The Ecological Crisis," in Social Behavior, Natural Resources and the Environment, Burch, et. al. (eds.), 1972, pp. 203-213.

The author indicates that if we are to understand and solve the ecological crisis it will be necessary to agree to the proposition that man's relationship to the natural world is a social problem. The cultural restraints working against direct understanding of environmental problems are the 1) abundance of natural resources 2) attitude toward population growth 3) city versus rural concepts of life 4) social mobility and 5) the dominance of analytical thinking. The traditional approach would assume that the answer lies in a repudiation of industrial society or in some magical ability of technology to come to our aid. Neither answer is likely to prevail. A redefinition of the problem is needed.

Morrison, Denton; Kenneth Hornback; and W. Keith Warner, "The Environmental Movement: Some Preliminary Observations and Predictions," Social Behavior, Natural Resources, and the Environment, Burch, et. al. (eds.), 1973, pp. 259-279.

This article illustrates that environmental issues, as other social issues, are imbedded in the tissue of social decision making and are likely to follow certain regularized patterns observed in other issues. The general focus of the analysis is on the environmental movement. Special attention is given to the environmentalists and their organizations, including the nature of their concerns, the changes they seek, their strategies and modes of organization, and their demographic and attitudinal characteristics.

Northrop, F.S.C., "Man's Relation to the Earth and It's Bearing on His Aesthetic, Ethical and Legal Values," in Man's Role in Changing the Face of the Earth, W.L. Thomas (ed.), Chicago: U.of C. Press, 1956, pp. 1052-67.

The author delineates between a technological and a non-technological civilization and then goes on to show how the instruments and methods of technological society have affected man's aesthetic sensitivity and creativity, his ethical and legal standards for ordering his relations to his fellow man, his emotive relation to nature itself and to its creation, and his moral standards for determining whether his tools are used for good or for bad ends. He finds that modern man has become so absorbed by the intellectual imagination, its technological tools, and abstract legal codes that he is starved emotionally and with respect to aesthetic immediacy. Traditional man, however, continues to destroy the natural source of aesthetic experience because of the emphasis on family values. A synthesis of these two components of complete human knowledge, supplementing the one with the other, will resolve the paradoxes of the two civilizations.

Shibutani, T., "Reference Groups as Perspectives," American Journal of Sociology, Vol. 60, 1955, pp. 562-569.

An extremely clear and powerful treatment of role of reference groups in the individual perspective. In the analysis of the behavior of men in pluralistic society the crucial problem is that of ascertaining how person defines the situation, which perspective he uses in arriving at such a definition, and who constitutes the audience whose responses provide the necessary confirmation and support for his position. The concept of reference group can greatly facilitate research on the manner in which each actor's orientation toward his world is structured.

Sonnenfeld, J., "Equivalence and Distortion of the Perceptual Environment," Environment and Behavior, Vol. 1, No. 1, 1969, pp. 83-99.

Individuals and populations vary in their sensitivity to the elements of the normally experienced geographic environment. In order to decipher some of the complexity of environmental meaning, a variant of the semantic differential was developed to find out how different populations evaluate and relate to certain basic elements. Two hypotheses were proposed: (1) that populations occupying different environments will not differ significantly in their characterization of the contextual elements of their environment, even though these be quite different; and (2) that populations will differ in their characterization of focal environmental elements even though they derive from quite similar environments. Data from a test given to populations in northern Alaska and Delaware appear generally to support the above hypotheses, though a number of rather interesting between- and within-population differences were found. Comparison of semantic differential test results with data from photo-slide landscape preference test suggests that personality variables may be an important source of some of the within-population differences, and a significant source of behavioral variation in environment generally.

Sonnenfeld, J., "Social Interaction and Environmental Relationship," Environment and Behavior, Vol. 4, 3, Sept., 1972, pp. 267-277.

The author uses the psychologist's concept of the dyad applied in a geographical context to give a new kind of structure for the study of environmental relationships. He develops a man - environment - other man model which yields a closer approximation to the real world man - environment - society relationship. Such a model assumes a concern not with landscapes and distribution patterns that derive from population-environment relationships, but rather with the behavior of specific individuals and groups whose impact on environment effects other individuals and groups capable of reaction.

Sonnenfeld, J., "Variable Values in Space and Landscape: An inquiry into the Nature of Environmental Necessity," Journal of Social Issues, Vol. 22, No. 4, 1966, pp. 71-82.

Given the occurence of change in personal values and demands for space and landscape, and change also in the availability of that space and landscape, the author discusses two ways -- adjustment and adaptation -- that

populations can accommodate to continued reductions in space and landscape. Through adjustment individuals or groups move to change laws, alter the environment, sublimate, or move, etc. Through adaptation the need to devise means for accomodation becomes less necessary. Adaptation to change involves reduced and/or increased sensitivity. Further, he states that a means of classifying environmental preferences can be based on the native/non-native differences. The native tends to adapt, the non-native to adjust. He concludes by stating that value of any landscape is likely not to rest on its specific character, but rather on the symbolisms -- social, aesthetic, and material -- that it represents and the relevant group being considered.

Stankey, George, "A Strategy for the Definition and Management of Wilderness Quality," Natural Environments, Krutilla (ed.), 1972, pp. 88-114.

According to the author, the quality of wilderness recreation can be judged only by examining the extent to which the motivations and objectives of the visitor who seeks the type of opportunity provided by wilderness are fulfilled. A strategy for defining the relevant visitor population based on an attitude scale which measures how the respondent feels about "Wilderness" as defined by the Act is put forth. The "purist" and multidimensional attitude towards wilderness is developed.

Task Force, Reg. 1, Management Practices in the Bitteroot National Forest, A Task Force Analysis, May 1969 - April 1970, Intermountain Forest and Range Experiment Station, Ogden, Utah.

A task force report on land management practices on the Bitteroot which was initiated because of public concern over clearcutting and road-building practices. This report reviews the F.S. approach to management and production (Cutting Methods, Terracing, Roads, Allowable Cut, Watershed) and makes recommendations as to how they may be improved. Increased esthetic awareness, an equalization of production and land management goals, and an increased and meaningful involvement of the public are called for.

Wapner, Seymour, et. al., "An Organismic-Developmental Perspective for Understanding Transactions of Men in Environments," Environment and Behavior, Vol. 5, No. 3, 1973, pp. 255-290.

A conception of environmental psychology is called for that emphasizes the way human beings actually experience their environments, the way they construe their worlds, and the way they undertake action on that basis. Eight procedural principals are elaborated to guide studies of men-in-environment relations. This is a dynamic model which focuses on the everyday world of the individual in his social and environmental setting.

White, Gilbert F., "The Formation and Role of Public Attitudes," in Environmental Quality in a Growing Economy: Essays from the Sixth Resources for the Future Forum, Henry Jarrett (ed.), John Hopkins, 1966, pp. 105-127.

This paper points to a number of different sources from which information about the public's values can be obtained and to a number of different methodologies that are appropriate to each of them. Among these are content analysis of speeches, textbooks, and newspapers, analysis of social criticism, specialized forms of opinion research, and the like.

Willhite, Robert G., Donald R. Bowlus, and Donald Tarbet, "An Approach for Resolution of Attitude Differences over Forest Management," Environment and Behavior, Vol. 5, No. 3, 1973, pp. 351-366.

An effort can be made to resolve specific forest management problems by determining the basic categories of attitudinal conflict according to the authors. Factor analysis techniques were used in this case study to find categories of related attitudes from statements presented to respondents. The 259 respondents were representative of students in forestry, psychology, natural sciences, and general education; as well as forestry professors, Sierra Club members, and Forest managers. Major categories found involved (1) motives of timber industries, (2) the practice of clearcutting, and (3) emotional or social values. Group responses indicated that formal forestry training was the greatest source of differences. Value systems of forestry people emphasized the technical aspects of forestry. Non-forestry people responded in a more emotional manner. Although forestry and non-forestry groups had opposite ratings, no one group was consistently at the extreme.

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